RESEARCH PROJECT SEGMENT

State: ALASKA Name: Sport Fish Investigations of Alaska.

Project No.: F-9-7

Study No.: G-I Study Title: INVENTORY AND CATALOGING

Job No.: G-I-B Job Title: Inventory and Cataloging of the Sport Fish and Sport Fish Waters in Southwest Alaska.

Period Covered: July 1, 1974 through June 30, 1975.

ABSTRACT

A total of ten lakes on Afognak Island within or near the Perenosa Bay timber sale, and Big River on the Alaska Peninsula were surveyed to determine physical, chemical, and biological properties. Water analyses were made monthly on seven Kodiak Island lakes. The results indicated seasonal dissolved oxygen, total alkalinity, total hardness, and pH ranges were 5.5-14.0 ppm, 8-60 ppm, 4-70 ppm, 5.9-8.2 ppm, respectively.

Thirty-nine managed lakes in the Kodiak area were sampled with variable mesh gill nets to assess survival and growth trends of rainbow trout, Salmo gairdneri, coho salmon, Oncorhynchus kisutch, Arctic grayling, Thymallus arcticus, and Dolly Varden, Salvelinus malma.

Rainbow trout from Ennis, Montana (155/lb.) and Winthrop, Washington (570/lb.) stocked June 21, 1973 in Margaret Lake averaged 204 and 189 mm, respectively, after 15 months residency. Gill net catches of the above fish averaged 0.90 and 0.64 fish per hour, respectively. Similar growth and survival trends were noted in other stocked lakes on Kodiak Island.

A postal survey of Kodiak licensed anglers indicated 54,351 Dolly Varden, 1,983 sockeye salmon, O. nerka, 7,378 pink salmon, O. gorbuscha, 561 chum salmon, O. keta, and 2,997 coho salmon were harvested from Kodiak Island waters.

Salmon escapement counts indicated approximately 45,900 pink salmon spawned in Buskin River and 1,000 king salmon, O. tshawytscha, spawned in Karluk River. Inclement weather prevented peak coho salmon counts; however, post spawning surveys indicated that major streams received adequate escapements.

Recommendations to protect fish habitat were made to the U.S.F.S. regarding logging on Afognak Island and to the Alaska Department of Fish and Game, Habitat Protection Section, concerning miscellaneous land use activities including road construction, seismic surveys, stream crossings, and gravel removal operations in the Kodiak area.

Land (12.5 acres) along the lower Pasagshak River was purchased to maintain angler access. Easement recommendations on lands selected under provisions of the ANCSA were submitted to A.D.F.& G. Habitat Protection Section.

The hypothesis that two different types of variable mesh monofilament gill nets, with identical mesh sizes, fished for a comparable period of time on near identical rainbow trout populations would yield statistically comparable results was tested. A one-way analysis of variance (equal or unequal groups) of trout length data from the different net types rejected the hypothesis at the 90.0% probability levels.

RECOMMENDATIONS

1. Discontinue intensive creel census surveys on all streams except Pasagshak and Buskin Rivers.

2. Evaluate the survival and growth trends and quality of fishing produced by various broods of stocked rainbow trout.

3. Evaluate growth and survival of grayling stocked in Roslyn Creek and Kodiak area lakes.

4. Determine the age composition of coho salmon from streams adjacent to the Kodiak Island road system.

OBJECTIVES

1. To determine the physical, chemical, and biological characteristics of existing and potential sport fishing streams and lakes in the Kodiak area.

2. To establish magnitude, distribution, timing, yearly fluctuations and angler harvest of sport fish populations on Kodiak Island, Afognak Island, and areas of concern to fisheries management on the Alaska Peninsula.

3. To investigate, evaluate, and develop plans for the enhancement of anadromous and resident fish stocks.

4. To assist as required in the investigation of public access status to the area's sport fishing waters and make specific recommendations for public access sites.

TECHNIQUES USED

Standard techniques as described by Murray and Van Hulle (1974) were used in lake surveys, gill net sampling, age analysis, and determination of fish size. One liter water samples, collected monthly from seven managed lakes, were analyzed with a DR-EL Hach Kit to determine chemical water properties. Physical properties (water temperature, ice and snow cover, freeze-up and break-up) were also recorded.

Sport harvest of salmon and Dolly Varden from the Kodiak area was estimated by the postal questionnaire (Figure 1 and 2) described by Murray and Van Hulle (1974). The positive bias factors observed on Buskin River (3.7) and Pasagshak River (3.89) in 1973 were utilized to calculate approximate harvest.

Differential catches of fish by size, taken by two differing types of variable mesh gill nets as described in Table 1, were determined by a one-way analysis of variance (Handbook of Mathematical Functions, 1969). Both nets were fished for comparable lengths of time and under near equal circumstances. Captured fish were recorded according to species, net type, net panel, and length of fish.

Table 1. Specifications of Two Gill Nets Used to Sample Fish Populations on Kodiak Island, 1974.

	Net A*	Net B*
Floatline		
Diameter	1/4"	1/4"
Color	Yellow	Green
Lead Line		
Diameter	1/4"	3/8"
Color	White	White
Color of Netting	White (Transparent)	Light Green (Transparent)
1/2" Bar Mesh	0.20 mm Mesh Diameter	0.18 mm Mesh Diameter
3/4" Bar Mesh	0.30 mm Mesh Diameter	0.20 mm Mesh Diameter
1" Bar Mesh	0.30 mm Mesh Diameter	0.25 mm Mesh Diameter
1 1/2" Bar Mesh	0.50 mm Mesh Diameter	0.30 mm Mesh Diameter
2" Bar Mesh	0.30 mm Mesh Diameter	0.45 mm Mesh Diameter

*Both nets were comprised of five separate panels of monofilament nylon gill netting (with the specifications listed above combined into one shackle of gill net using one continuous length of float line and one continuous length of lead line.

☐ I did not fish for Dolly Varden.

☐ I fished Dolly Varden	No. Times Fished	No. Fish Retained
Buskin River		
Pasagshak R. (Lk. Rose Tead)		
Saltwater Area		
Other Streams		

☐ I did not fish for Red Salmon.

☐ I fished Red Salmon	No. Times Fished	No. Fish Retained
Buskin River		
Pasagshak River		
Other Streams		

Signed.....

FIGURE 1. Postal Questionnaire Used to Sample Anglers Holding a Valid Fishing Permit from January 1 to July 15.

I did/did not fish for salmon. I did/did not fish for Dolly Varden.

River	No. Times Fished	Total Number Fish Retained: Pink S.	Dog S.	Silver S.	Dolly Varden
American					
Buskin					
Kalsin					
Olds					
Pasagshak					
Roslya					
Saltery					
Solonie					
Other Streams					
Saltwater					

Any comments or recommendations you have regarding the Kodiak Sport fishery would be appreciated: _____

Signed.....

Figure 2. Postal Questionnaire Used to Sample Anglers Holding a Valid Fishing Permit from January 1 to October 15.

FINDINGS

Lake and Stream Surveys

Lake surveys during 1974 determined physical, chemical and biological characteristics of ten lakes within or contingent to the Perenosa Bay timber sale, Afognak Island (Figure 3). Three lakes (No. 13582, 13566 and LiLy Pad Lake) were found sufficient in size and depth to support recreational sport fisheries (Table 2). Dolly Varden, Salvelinus malma, and threespine stickleback, Gasterosteus aculeatus, were captured or observed in all waters; however, rainbow trout, Salmo gairdneri, and coho salmon, Oncorhynchus kisutch, were also captured in LiLy Pad Lake. Analysis of age and size data as presented in Table 3 suggests normal growth characteristics for salmon, Dolly Varden, and rainbow trout on Afognak Island. The trout (n=4) were age class IV and ranged in length from 269-294 mm.

The outlet of Lake No. 13566 is listed as anadromous fish stream No. 251-824; however, a 20 foot waterfall near tide water prevents upstream fish passage. The pH of lakes No. 13566 and No. 13582 was 7.2 with total hardness and total alkalinity approximately 40 ppm (Table 4).

A swift current and debris laden bottom prevented drift gill net sampling of Big River (T18S, R28W). Although six hours of hook and line sampling captured seven adult Dolly Varden, and 72 minnow trap hours produced 20 juvenile Dolly Varden and one coho salmon smolt. Pink salmon, O. gorbuscha, and chum salmon, O. keta, carcasses were observed above the mean high water line. Water quality analysis for Big River is presented in Table 4.

Examination of the test netting data listed in Table 5 suggests survival of rainbow trout is poor beyond age II. (In general, growth and survival of rainbow trout to age II is sufficient in Kodiak Island lakes to produce a viable sport fishery). Although intensive lake creel censuses have not been conducted, cursory checks suggest a bulk of the fish mortality is due to angler harvest. During the fall and winter of 1974 nine Lake Genevieve anglers reported a total catch of 453 rainbow trout.

Growth and survival of Washington and Montana trout stocked in Kodiak lakes is described by the samples (Table 5) collected from Margaret Lake (rehabilitated October 2, 1972). Equal numbers of each strain (101 fish/surface area) were planted June 21, 1973; however, the early hatching Ennis fish (155/lb.) were 3.68 times heavier than Winthrop fish (570/lb.). An overnight gill net set on July 26, 1974 captured 38 Ennis and 36 Winthrop fish averaging 197 mm and 183 mm, respectively. On September 27, an overnight net set captured 31 Ennis and 22 Winthrop fish averaging 204 mm and 189 mm, respectively. At each sampling Ennis fish averaged approximately 15 mm longer than Winthrop fish with both strains attaining a catchable size by age II. (The adipose fin was removed from all Ennis trout; therefore, the overall survival rate may have been reduced).

Grayling, Thymallus arcticus stocked as fry June 16, 1973 in Abercrombie Lake (rehabilitated 1972) competed successfully with fingerling rainbow

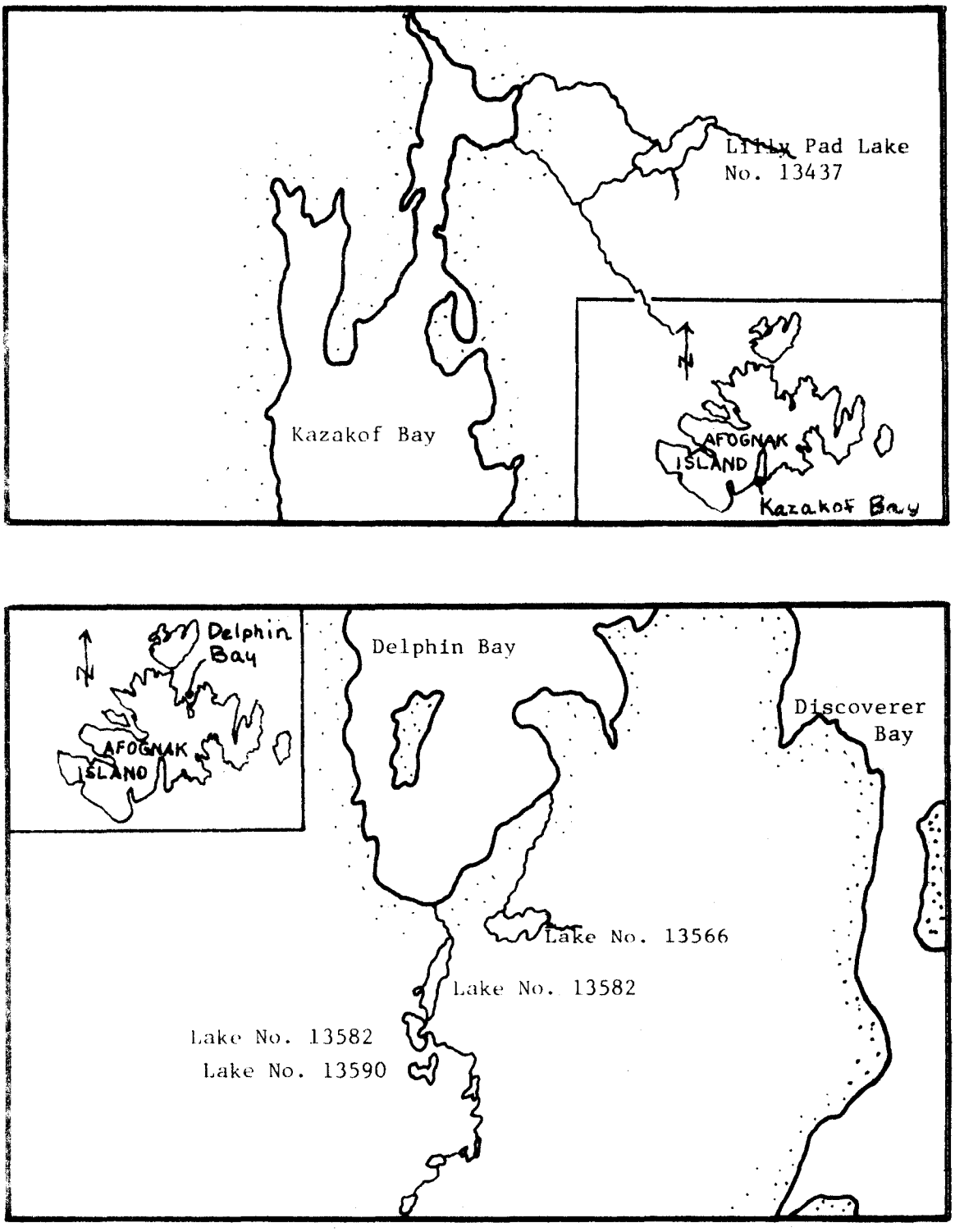

Figure 5. Location of Lakes and Streams Surveyed on Afognak Island, 1974.

Table 2. Location and Physical Characteristics of Five Lakes Surveyed on Afognak Island, September 19-October 10, 1974.

Lake Number & Location	Drains to	Surface Acres	Approximate Volume (Acre/Foot)	Mean Depth (Feet)	Fish Species Present*	Catch/ Hour**
No. 13437 T23S, R20W, Sec. 3 & 10	Danger Bay	50	250-350	5-7	SS DV RT SB SC	Observed " " " "
No. 13566 T21S, R19W, Sec. 30	Delphin Bay	32	486	15.1	DV DV SB	N-0.630 T-0.606 T-0.145
No. 13582 T21S, R20W, Sec. 25	Delphin Bay	34	200-240	6-7	DV DV SB	N-1.426 T-0.820 T-0.047
No. 13583 Tw1S, R20W, Sec. 25	Delphin Bay via No. 13582	12	42	3.5	DV SB	Observed "
No. 13590 T21S, R20W, Sec. 36	Delphin Bay via No. 13582 and No. 13583	10	35	3.5	DV SB	Observed

* DV=Dolly Varden
SB=Threespine Stickleback
SC=Sculpin
RT=Rainbow Trout
SS=Silver Salmon (coho)
**N=Standard monofilament gill net
T=Minnow Trap

Table 3. Fish Sampling Data for Waters Surveyed During 1974.

Date	Gear	Fish*	Age	No.	Hours Effort	Length (mm) Range	Mean
Big River (Alaska Penin.)							
4-26-74	Hook & Line	DV	Adults	-	6.0	424-501	470.4
	Minnow Trap	DV	Juveniles	20	72.0	51-125	76.6
		CS	2.0	1		93	
Lily Pad Lake (Afognak Is.)							
9-17-74	Minnow Trap	CS	0.0	1		55	-
		CS	1.0	30	90	78-737	112.6
		CS	2.0 Male	2		315-320	317.5
		CS	3.0 Male	1		267	-
	Hook & Line	CS	2.1 Male	8		510-637	584
		CS	3.1 Male	3		520-635	574
		CS	2.1 Female	2		600-620	610
		CS	3.1 Female	2		590-600	595
		RT	IV	4		269-294	284
Lake No. 13582 (Afognak Is.)							
10- 8 to	Gill Net	DV	-	37	28.0	116-401	215.1
10- 9-74	Minnow Trap	DV	-	74	144.0	50-139	97.4
Lake No. 13566 (Afognak Is.)							
10- 9 to	Gill Net	DV	-	29	39.25	103-298	188.5
10-10-74	Minnow Trap	DV	-	68	149.0	53-180	119.4

*DV=Dolly Varden
CS=Coho (Silver) salmon
RT=Rainbow Trout

Table 4. Water Quality Analysis of Lakes and Streams, Kodiak Island-Alaska Peninsula Areas, Surveyed During 1974.

System	Location	Date	Sample Location	Depth	Temp. °C	CO_2 (ppm)	T. Alk. (ppm)	T. Hard (ppm)	pH	Color
No. 13566	Afognak	10- 8	Mid-Lake	3'	7.2	20	40	50	7.2	Light Brown
No. 13582	Afognak	10- 9	Mid-Lake	3'	7.2	20	40	40	7.2	Light Brown
Big River	Alaska Penin.	4-25	2 Mi. Upstream	Surface	4.5	-	70	60	7.3	Clear

trout (261/lb.) stocked July 9, 1973. Gill net sampling on July 26, 1974 indicated grayling were 24 mm smaller than the rainbow trout; however, by October 1, 1974, grayling were 20 mm longer and 1.43 times heavier than the rainbow trout (Table 5).

Natural reproduction of grayling in Cascade Lake appears sufficient to support the present sport fishery. Only one rainbow trout from the 1971 plant was captured, suggesting poor natural reproduction.

Survival and growth of land-locked coho in Mayflower and Pony lakes appears poor. Both waters contain threespine stickleback and the lower 12 feet of Mayflower Lake remains saline (17 ppt.) from the 1964 tidal wave.

Water chemistry data listed in Table 6 indicate all lakes contained nearly neutral water. Chemical ranges, particularly dissolved oxygen, probably do not reflect a usual seasonal trend, as Kodiak received high rainfall in November (7.5 inches) and January (10.52 inches). Further sampling is recommended to determine typical seasonal water chemistry fluctuations.

Gill Net Variability

A total of 404 rainbow trout were captured by two types of variable mesh gill nets (Table 7) in 515.75 net hours. Overall catch per unit of effort was similar (0.8, net "A" and 0.7, net "B") but a substantial catch difference was noted in the 1/2 inch mesh panel. Net "A" failed to capture representative samples of available trout in the 100+ mm range, suggesting a complete failure of the previous years stocking program. Net "B" showed good survival of this size group. The minimal trout catches in the 1 1/2 inch and 2 inch panels are probably related to the small numbers of large fish in stocked lakes rather than to net selectivity.

Statistical analysis of variance as described in the Handbook of Mathematical Functions (1969), determined the nets sampled different rainbow trout sub-populations at the 90% probability levels ($F = 2.868, k=2, n-k = 402$).

Table 5. Population Characteristics of Kodiak Area Lakes as Defined by Variable-Mesh Gill Nets, 1974.

Lake Name & Location	Sampling Data: Date Sampled	Species*	Number	Age Class	Length (mm): Range	Length (mm): Mean	Weight (gr): Range	Weight (gr): Mean	Catch/ Net Hr.	History: Date Stocked**	Total Number	Per Lb.	Per Acre
Abercrombie	7/26	RT	33	1.0	140-195	162	35.0- 72.0	50.0	1.83	7/ 9/73	3,625	261	194
T27S, R19W	10/ 1	RT	32	1.0	148-206	172	40.8-100.4	57.2	0.45	7/ 9/73	3,625	261	194
Sec. 15	10/ 1	GR	12	1.0	155-238	192	39.3-165.6	82.0	0.17	6/16/73	55,000	Fry	2,941
	7/24	GR	7	1.0	118-168	138	18.0- 49.0	27.9	0.39	6/16/73	55,000	Fry	2,941
Aurel	7/24	RT	1	3.0	368		508		0.027	7/27/71	3,000	306	200
T28S, R21W		GR	6	1.0	205-226	214	101-147	120.0	0.162				
Sec. 36													
Barry Lagoon	7/16	DV	61	***	122-379	289	---	---	1.386	NR	NR	NR	NR
T31S, R19W	7/16	CS	10	1.0	120-178	171	29- 53	40.6	0.227	6/22/73	39,720	518	167
Sec. 28		CS	1	2.0	205-238	221	111-141	126.6	0.159	NR	NR	NR	NR
Beaver Lake	7/18	RT	17	1.0	150-184	158	38- 71	46.1	13.60	6/20/74	600	1,449	300
T31S, R20W		DV	3	***	157-188	175	49- 62	54.0	2.40	NR	NR	NR	NR
Sec. 31													
Bull Lake	7/16	RT	8	1.0	209-269	241	100-255	173.4	0.348	6/22/73	2,200	570	222
T31S, R20W	9/18	RT	1	1.0	248	---	161	---	0.010	6/22/73	2,200	570	222
Sec. 35		RT	2	0.0	140-145	---	36- 38	---	0.021	6/20/74	3,000	1,449	302
		RT	1	2.0	401	---	736	---	0.010	8/11/72	2,000	556	202
Caroline	7/31	RT	2	0.0	90- 90	---	9.5-10.0	---	0.107	6/21/74	1,300	1,449	197
T28S, R21W		RT	1	1.0	169	---	65	---	0.053	6/22/73	1,300	556	197
Sec. 36													
Cascade	8/1	GR	7	1.0	152-184	169	48- 71	58.4	0.359	NR			
T27S, R21W		GR	3	2.0	240-250	246	179-195	186.3	0.154	NR	NR	NR	
Sec. 12		GR	6	3.0	263-272	267	219-261	236.0	0.308	NR	NR	NR	
		GR	4	4.0	273-295	286	278-303	292.5	0.205	NR	NR	NR	
		RT	2	2.0	198-215	204	85-113	101.5	0.103	NR	NR	NR	
		RT	1	3.0	302	---	334	---	0.051	7/29/71	3,000	543	183
Jack	7/19	RT	16	1.0	135-220	174	41-129	69	0.810	6/21/73	900	155	191
T28S, R21W													
Sec. 36													
Jupiter	7/23	RT	14	1.0	169-270	211	58-163	116	0.596	6/21/73	3,600	155	206
T30S, R21W													
Sec. 18													
Lee	7/19	RT	23	1.0	112-263	212	26-253	152	0.590	7/19/73	2,800	155	196
T28S, R21W													
Sec. 36													

Table 5. Contd. Population Characteristics of Kodiak Area Lakes as Defined by Variable-Mesh Gill Nets, 1974.

Lake Name & Location	Sampling Data: Date Sampled	Species*	Number	Age Class	Length (mm): Range	Length (mm): Mean	Weight (gr): Range	Weight (gr): Mean	Catch/ Net Hr.	History: Date Stocked**	History: Total Number	History: Per Lb.	History: Per Acre
Lilly	7/24	RT	4	0.0	83- 89	86	---	---	0.889	6/20/74	1,000	1,449	127
T28S, R20W		RT	2	2.0	362-386	369	577-697	637	0.444	8/23/72	2,000	556	254
Sec. 27													
Louise	1/14	DV	12	***	112-294	177	14-207	59.0	0.261	NR	NR	NR	NR
T28S, R20W		CS	6	1.0	98-118	106	10- 17	12.8	0.130	NR	NR	NR	NR
Sec. 10		CS	7	2.0	103-158	128	11- 42	25.9	0.152	NR	NR	NR	NR
	5/ 6	DV	6	***	216-263	248	90-140	117.6	0.500	NR	NR	NR	NR
		CS	3	1.0	103-114	107	10- 18	13.0	0.250	NR	NR	NR	NR
		CS	1	2.0	129	---	18	---	0.083	NR	NR	NR	NR
Lupine	7/16	RT	29	0.0	87-103	93.9	---	10.8	1.234	6/20/74	1,500	150	200
T21S, R20W		RT	41	1.0	159-248	218.1	72-172	133.0	1.745	6/23/73	1,500	155	200
Sec. 35	9/20	RT	3	0.0	145-165	153.7	39- 49	44.3	0.067	6/20/74	1,500	150	200
		RT	19	1.0	194-269	241.7	82-263	166.6	0.422	6/23/73	1,500	155	200
Margaret	7/26	RT(E)	17	0.0	92-110	93.1	10- 18	11.9	0.861	6/21/74	800	150	101
T28S, R20W		RT(W)	1	0.0	103	---	12	--	0.051	6/21/74	800	1,449	101
Sec. 11		RT(E)	38	1.0	175-222	197.2	61-128	95.2	1.924	6/21/73	800	155	101
		RT(W)	36	1.0	157-210	182.8	49-141	76.9	1.823	6/21/73	800	570	101
	9/27	RT(E)	31	1.0	176-230	204.0	64-138	97.2	0.899	6/21/73	800	155	101
		RT(W)	22	1.0	156-226	189.0	40-140	78.7	0.638	6/21/73	800	570	101
Mayflower	7/25	DV	26	***	128-319	205.7	23-383	116.5	0.612	NR	NR	NR	NR
T29S, R20W		CS	1	2.0	207	---	119	---	0.024	7/27/71	2,500	500	201
Sec. 23		RT	1	3.0	262	---	234	---	0.024	UK	---	---	---
Orbin	7/19	DV	29	***	173-287	213.3	62-241	104.2	1.506	NR	NR	NR	NR
T28S, R20W													
Sec. 31													
Pony	7/24	CS	4	1.0	117-122	119.3	18- 19	18.3	0.082	6/23/73	2.770	518	194
T29S, R19W		CS	7	2.0	147-198	169.7	32- 83	53.0	0.144	6/16/72	2,800	591	196
Sec. 36													
Saturn	7/23	RT	11	1.0	167-222	198.8	45-152	107.6	0.463	6/23/73	2,400	155	205
T30S, R18W		RT	1	2.0	281	---	339	---	0.042	8/11/72	2,400	556	205
Sec. 18													
Snag	7/18	RT	9	0.0	86-103	94.2	9- 14	12.4	0.474	6/24/74	1,610	150	322
T28S, R20W		RT	30	1.0	110-234	175.2	34-116	75.8	1.579	6/21/73	1,500	155	300
Sec. 35	9/25	RT	26	1.0	155-237	187.7	43-146	80.2	0.553	6/21/73	1,500	155	300
Southern	7/30	CS	42	1.0	152-191	163.8	44- 78	53.6	1.888	6/26/73	3,000	966	172
T28S, R19W		CS	2	2.0	226-234	230.0	133-142	137.5	0.090	8/11/72	3,300	222	189
Sec. 14		CS	1	3.0	299	---	222	---	0.045	6/16/71	3,500	591	201

Table 5. Contd Population Characteristics of Kodiak Area Lakes as Defined by Variable-Mesh Gill Nets, 1974.

Lake Name & Location	Sampling Data: Date Sampled	Species*	Number	Age Class	Length (mm): Range	Length (mm): Mean	Weight (gr): Range	Weight (gr): Mean	Catch/ Net Hr.	History: Date Stocked**	Total Number	Per Lb.	Per Acre
Summit	7/11	RT	2	1.0	198-205	201.5	73-100	86.5	0.062	7/9/73	7,400	261	101
T30S, R20W		DV	83	***	111-260	160.1	13-165	49.1	2.574	NR	NR	NR	NR
Sec. 31													
Tanignak	7/30	RT	9	1.0	160-237	202.9	56-165	107.4	0.622	6/25/73	6,500	155	218
T27S, R19W		RT	5	2.0	244-319	282.0	188-393	244.4	0.222	8/11/72	6,500	556	218
Sec. 3													

* DV - Dolly Varden
GR - Grayling
RT - Rainbow Trout
CS - Coho salmon
RS - Red salmon
E - Ennis, Montana strain
W - Winthrop, Washington strain
** UN - Unknown
NR - Natural reproduction
***Fish were not aged

Table 6. Water Characteristics of Seven Kodiak Lakes Sampled Mid-Monthly, March 15, 1974-January 15, 1975.

Lake	Total Alk. (ppm)		Total Hard. (ppm)		pH		Dissolved Oxygen (ppm)		Temperature °C		Break-Up	Ice Cover (In.)		Freeze Up	Snow Cover (In.)	
	Mean	Range	$\bar{x}$	Range	$\bar{x}$	Range	$\bar{x}$	Range	$\bar{x}$	Range		$\bar{x}$	Range		$\bar{x}$	Range
Abercrombie	35.6	24-60	42.3	32-70	7.4	6.3-8.2	9.1	6.0-14.0	8.5	0-18.5	Mid-May	14.1	6.0-23.5	Mid-Nov.	6.0	4.0 - 8.0
Margaret	24.7	18-50	21.6	16-40	7.1	6.0-7.9	9.2	6.0-11.5	8.4	0.20.0	Late April	14.2	4.5-19.0	Mid-Nov.	7.0	2.0 -14.0
Lupine	24.7	19-30	17.3	10-22	7.1	6.0-8.2	8.4	6.0-11.5	8.6	1.0-19.0	Mid-April	14.2	4.5-19.0	Mid-Nov.	3.1	.25- 6.0
Genevieve	19.7	12-40	17.8	12-30	7.0	6.0-7.7	9.6	7.0-13.0	8.3	0.5-19.0	Mid-May	18.0	5.0-29.0	Mid-Nov.	9.5	3.0 -16.0
Bull	19.4	10-50	13.2	8-20	7.1	6.0-7.7	9.6	6.5-13.0	8.6	1.0-19.0	Mid-April	14.2	4.5-19.0	Mid-Nov.	5.1	.25-10.0
Lee	17.6	12-40	10.6	8-20	6.9	5.9-7.8	9.6	5.5-13.5	8.4	1.5-21.0	Mid-May	21.5	8.5-33.0	Mid-Nov.	6.2	1.5 -13.0
Dragonfly	15.6	8-40	9.8	4-20	6.8	6.1-7.4	9.1	6.0-12.0	8.6	1.0-21.0	Mid-May	18.0	8.0-28.0	Mid-Nov.	4.2	1.0 - 7.0

Table 7. Rainbow Trout Size and Catch Rates as Defined by Two Different Types of Variable Mesh Gill Nets Fished for Similar Periods of Time on Identical Fish Populations, Kodiak Island, 1974.

	Yellow Lined Gill Net (Type A)					
Bar Mesh	1/2"	3/4"	1"	1 1/2"	2"	Total
Mesh Dia. (mm)	0.20	0.30	0.30	0.50	0.30	-
Number	2	136	77	2	-	217
C.P.U.E.*	0.008	0.548	0.299	0.008	-	0.843
Range (mm)	145-192	143-264	140-269	185-269	-	145-269
$\bar{X}$ (mm)	$168.^{5}$	$174.^{9}$	$209.^{0}$	$227.^{0}$	-	$187.^{5}$
s.d.	$33.^{2}$	$19.^{0}$	$27.^{1}$	$59.^{4}$	-	$28.^{2}$
s.e.	$23.^{5}$	1.6^{3}	$3.^{1}$	$42.^{0}$	-	$1.^{9}$

	Green Lined Gill Net (Type B)					
Bar Mesh	1/2"	3/4"	1"	1 1/2"	2"	Total
Mesh Dia. (mm)	0.18	0.20	0.25	0.30	0.45	-
	46	49	83	9	-	187
C.P.U.E.**	0.18	0.19	0.32	0.04	-	0.72
Range (mm)	86-241	145-243	110-266	175-401	-	46-401
$\bar{X}$ (mm)	$104.^{8}$	$176.^{1}$	$216.^{8}$	$241.^{8}$	-	$180.^{4}$
s.d.	$39.^{12}$	$29.^{43}$	$25.^{21}$	$69.^{09}$	-	$55.^{99}$
s.e	$5.^{71}$	$4.^{20}$	$2.^{76}$	$23.^{03}$	-	$4.^{09}$

* Based on $257.^{50}$ net hours of fishing.
**Based on $258.^{25}$ net hours of fishing.

Inadequate samples of coho salmon, Dolly Varden, and grayling preclude statistical inference regarding net selectivity.

Gill net selection curves for nets used in Kodiak lakes should be defined and specific criteria established for the future purchase of gill nets used for the purpose of collecting research data.

Assessment and Inventory of Anadromous Fish Populations

Buskin River Dolly Varden and Salmon:

Spot checks on Buskin River indicated the Dolly Varden out-migration commenced May 1 and continued through early June. Eleven anglers interviewed May 15 and 16 had harvested 6.32 fish per hour. Dolly Varden (n=91) sampled from angler creels ranged from 202-393 mm ($\bar{x}$ =282 mm). Total harvest, as calculated from the postal survey, was 26,387 Dolly Varden with 14,040 (53.2%) caught in the spring fishery.

Buskin River sockeye salmon, O. nerka, in-migration commenced June 1 and continued through early July. Approximately 2,000 sockeye escaped for spawning purposes while 409 were harvested by sport and 336 by subsistence fisheries. (Subsistence harvest is the catch reported by 19.1% of the permits which had been returned at the time of reporting).

A foot survey (August 10) indicated approximately 45,800 pink salmon spawned in Buskin River during 1974. Sport fishermen harvested 2,186, or 4.6% of the spawning escapement.

Sport anglers harvested 1,049 Buskin River coho salmon. Spawning escapement counts during October were impossible to conduct due to flooding conditions; however, approximately 250 post-spawning coho salmon were enumerated on November 12 during an aerial survey.

Uganik Lake Dolly Varden, Coho Salmon, and Rainbow Trout:

Four gill nets set in Uganik Lake for 52.75 net hours, May 8 and 9, captured 235 Dolly Varden and five coho salmon (Table 8). The high catch per unit of effort (4.45 fish/hour) was due to a large concentration of char near the lake outlet staging their seaward migration. Dolly Varden ranged in length from 105-611 mm ($\bar{x}$=307.8 mm) and in age from IV-VIII+ years. Coho salmon captured by minnow trap and gill net (n=73) were age 1.0 (75.3%), 2.0 (23.3%), and 3.0 (1.4%), and averaged 57.5, 81.2, and 146 mm in length, respectively.

Over 100 Dolly Varden and nine rainbow trout were captured in 27 hours of hook and line sampling. Age and growth analysis indicated the trout were resident fish, age V and VI, averaging 368.3-466.7 mm in length, respectively.

Table 8. Uganik Lake Fish Sampling Data, May 8-9, 1974.

Uganik Lake (Kodiak Island)

Gear	Fish*	Age	No.	Hours of Effort	Length (mm) Range	Length (mm) Mean	Weight (g) Range	Weight (g) Mean
Gill Net								
	DV	-	16	10.0	126-520	312.6	17-1,250	423.5
	DV	-	219	42.75	105-611	307.4	10-2,000	357.9
	CS	2.0	3		104-114	110.6	-	-
	CS	3.0	1		146	-	-	-
Minnow Traps								
	DV	-	82	160.0				
	CS	1.0	55		45- 66	57.5	-	-
	CS	2.0	14		70-102	75.0	-	-
	COT	-	3		-	-	-	-
Hook & Line								
	RT	V	6		321-391	368.3	-	-
	RT	VI	3	27.0	410-552	466.7	-	-

*DV -Dolly Varden
CS -Coho salmon
RT -Rainbow Trout
COT-Cottidae

Karluk River Rainbow-Steelhead Trout and Chinook Salmon:

Age-growth data as presented in Tables 9 and 10 indicate the 1973 and 1974 Karluk steelhead runs are in excellent condition. Multiple age classes, with several repeat spawners (13.4%-1973 and 18.7%-1974) were represented in each sample. Approximately one-half of the fish in each sample were progeny of the 1969 escapement while parent year 1968 produced one-third of the May sample. Parent years 1968 and 1970, respectively, produced 20.9% and 23.3% of the fall sample. Catch per hour was 0.94 and 2.0 fish respectively for spring and fall sampling.

A float survey of Karluk River (Figure 4) on August 13 and 14, enumerated 771 chinook salmon, O. tshawytscha. Fish sampled for sexual maturity were near ripe or in spawning condition. Counting conditions were excellent and it is estimated that approximately 1,000 chinook salmon spawned in Karluk River during 1974.

Sport angling as voluntarily reported in the Portage Cabin Log Book was excellent. A total of 47 anglers reportedly retained 57 chinook salmon and released 74 (56.5%) for a total catch of 131 fish. Observations of the fishery indicate a harvest of approximately 200 chinook salmon and 150 rainbow-steelhead trout.

Table 9. Age and Size Composition of Steelhead-Rainbow Trout Sampled At Karluk River Portage, May 15-16, 1974.

	Age	Brood Year	No.*	% Total	Length (mm) Range	Mean
Male:	3.1 S **	1968	3	60	538-795	675
	2.1 S	1969	2	40	552-580	556
Female:	3.1 SSS	1966	1	10	796	-
	2.1 SSS	1967	1	10	823	-
	3.1 S	1968	1	10	649	-
	2.2 S	1968	1	10	671	-
	2.1 S	1969	6	60	515-700	627
% Total (Combined)	3.1 SSS	1966	1	6.7		
	2.1 SSS	1967	1	6.7		
	3.1 S	1968	4	33.3		
	2.2 S	1968	1			
	2.1 S	1969	8	53.3		

*Two rainbow-steelhead trout had unreadable scales.
**S - Repeat Spawners

Table 10. Age and Size Composition of Rainbow-Steelhead Trout Sampled At Karluk River Portage, October 12-14, 1974.

	Age	Brood Year	No.*	% Total	Length (mm) Range	Mean
Male:	3.1 S	1968	3	13.6	622-762	703
	3.1	1969	12	54.5	548-679	629
	2.1 S	1969	1	4.5	698	-
	2.1	1970	6	27.3	546-648	602
Female:	3.1 SS	1967	2	9.5	737-889	813
	2.1 SS	1968	2	9.5	737-737	737
	3.2	1968	4	19.0	660-698	679
	2.2	1969	2	9.5	673-686	680
	3.1	1969	6	28.6	584-686	626
	2.1	1970	4	19.0	572-724	645
	5.0	1968	1	4.8	432	-
% Total (Combined):						
	3.1 SS	1967	2	4.7	4.7	
	3.1 S	1968	3	7.0		
	2.1 SS	1968	2	4.7	20.9	
	3.2	1968	4	9.3		
	3.1	1969	18	41.9		
	2.1 S	1969	1	2.3	48.8	
	2.2	1969	2	4.7		
	2.1	1970	10	23.3	23.3	
	5.0	1968	1	2.3	2.3	

*A total of 47 rainbow-steelhead trout were sampled; however, four scale samples were unreadable.

Ayakulik Chinook Salmon and Rainbow-Steelhead Trout:

Commercial fish division personnel enumerated 851 chinook salmon passing through the Ayakulik weir (Red River) between May 22-August 27, 1974. A total of 15 anglers checked at the weir during the entire season retained approximately 30 chinook. Weir pickets were periodically removed during mid-June to facilitate passage of down-migrant Dolly Varden, sockeye smolt, and steelhead trout. Counts of either species were not made, however, trout fishing was reported to be excellent.

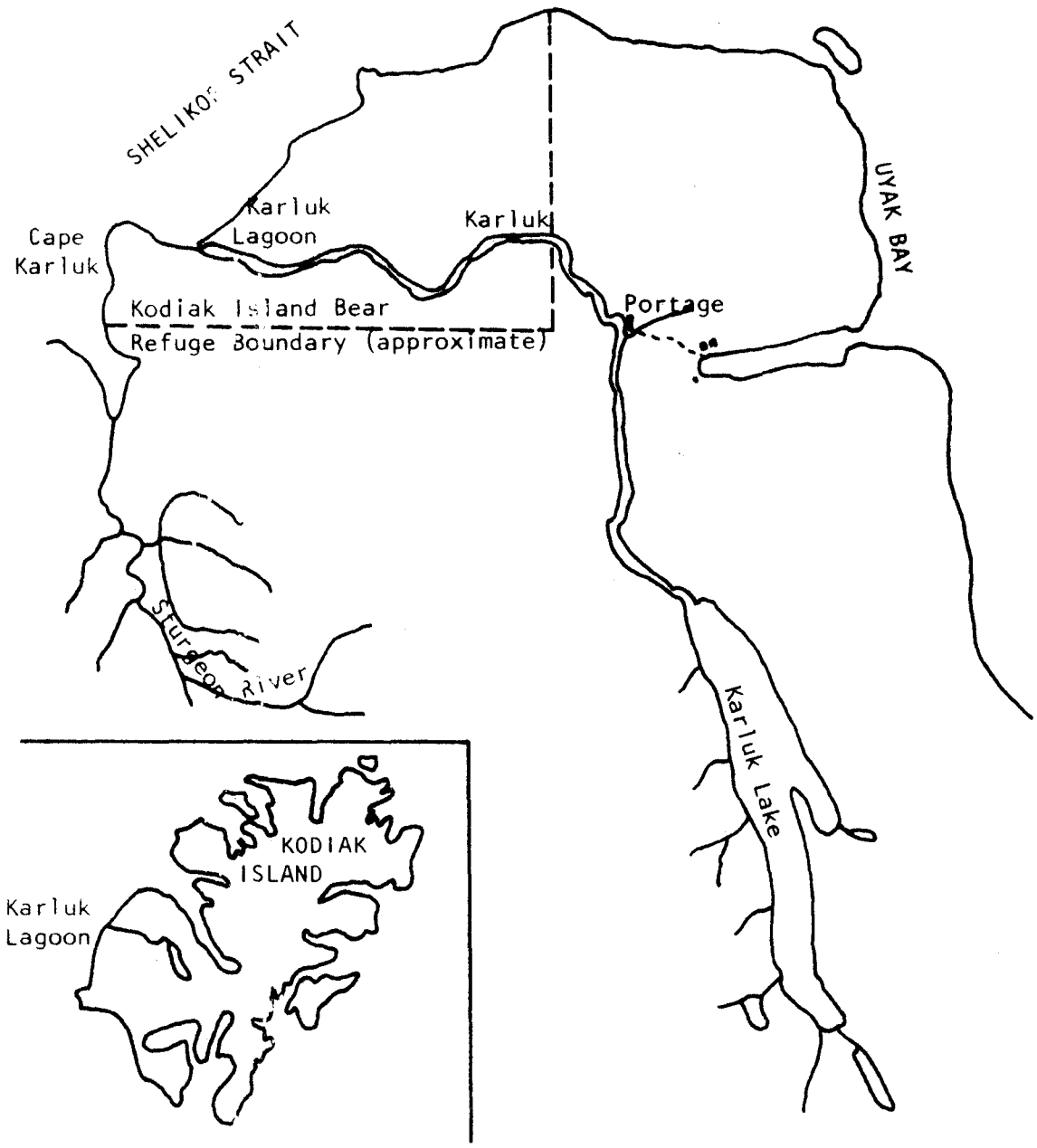

FIGURE 4. KARLUK LAKE SYSTEM

Salmon and Dolly Varden, Harvest and Escapement

A total of 561 chum salmon, 1,983 sockeye salmon, 2,997 coho salmon, 7,378 pink salmon, and 54,351 Dolly Varden, as determined by the postal survey, were harvested in the Kodiak area by sport anglers. Harvest data shown in Table 11 indicates the largest catches came from Buskin River, Pasagshak River and Saltery Creek. Most of the Dolly Varden (45,225 or 83.2%) were harvested from streams on the Kodiak road system. Other streams and salt water areas respectively produced 7.8% (4,249) and 9.0% (4,877) of the total catch. The corresponding escapement counts for the harvest estimates (Tables 11 and 12) were sufficient to allow propagation of future salmon runs.

Inclement weather and flooding conditions prevented timely coho salmon escapement counts; however, foot surveys were conducted in late October on nine small streams where water depth and clarity permitted counting. An aerial survey was conducted on eight additional streams November 12, when climatic conditions inproved. Fish observed on the later survey were in post spawning condition and the counts as presented in Tables 11 and 12 are not consodered the total escapement.

Table 11. Harvest and Escapement Estimates of Salmon and Dolly Varden, NE Kodiak Island, 1974.

System	Sockeye Salmon		Pink Salmon		Chum Salmon		Silver Salmon		Dolly Varden
	Harvest	Escapement***	Harvest	Escapement	Harvest	Escapement	Harvest	Escapement	Harvest
American	-	-	886	17,000**	171	-	78	300**	3,628
Buskin	409	2,000***	2,186	45,815***	147	-	1,049	500**	26,387
Kalsin	-	-	408	-	19	-	54	75**	0
Olds	-	-	96	36,000**	0	1,200**	19	50**	603
Pasagshak	160	4,000**	537	-	44	-	609	210**	8,032
Roslyn	-	-	177	4,000**	0	-	35	100***	287
Salonie	-	-	7	2,000**	0	-	63	300***	0
Saltery	-	2,700**	615	17,000**	109	500**	340	600**	6,207
Other Streams	1,414	-	500	-	8	-	486	-	4,249
Salt Water	0	-	1,966	-	63	-	264	-	4,877
Total	1,983		7,378		561		2,997		54,351

* Harvest calculated from postal questionnaire.
** Escapement based on aerial survey.
***Escapement based on foot survey.

1 actual count.

Table 12. Silver Salmon Harvest and Escapement Estimates, NE Kodiak Island, 1974.

System	Date	Survey Method	Spawning Escapement Count	Spawning Escapement Estimate	Sport Catch Estimate	Total Run Estimate
American River	11-12	Aerial	250	300*	78	378
Buskin Lake	11-12	Aerial	250	500*	1,049	1,549
Chiniak Creek	10-25	Foot	115	150	No Est.	None
Cliff Pt. Creek	10-23	Foot	35	50	0	50
Elbow Creek	11-12	Aerial	0	0*	No Est.	None
Kalsin River & Creek	11-12	Aerial	50	75*	54	129
Lake Rose Tead	11-12	Aerial	210	No Est.*	609	None
Marshy Creek	10-25	Foot	6	No Est.	No Est.	None
Miam Lake	9-20	Foot	1,300	1,500	50	1,550
Monashka Creek	10-22	Foot	3	No Est.*	No Est.	None
Olds River	11-12*	Aerial	7	50	19	69
Pillar Creek	10-25	Foot	11	No Est.*	None	None
Roslyn River	10-24	Foot	76	100	35	135
Russian River	10-25	Foot	39	No Est.*	No Est.	None
Salonie Creek	10-22	Foot	291	300	63	363
Saltery Creek	11-12*	Aerial	462	600	340	940
Sargent Creek	10-25	Foot	24	No Est.	No Est.	None

*Escapement estimates are approximations based on one post spawning survey, on harvest trends, and on personal observations of the fisheries.

Observations at Pasagshak River suggested a large portion of the coho salmon harvest were jack salmon. Age and growth analysis of 27 angler-caught coho (Table 13) indicated 17 were precocious males which averaged 412 mm (16.2 inches) fork length. Additional data will be obtained in 1975 to evaluate an increased bag limit (15 fish) on jack salmon 16 inches or less in total length.

Table 13. Age and Size of Angler-Caught Coho Salmon, Pasagshak River, August 25-September 15, 1974.

	Age	Brood Year	No.	Length (mm) Range	Mean	% Total
Male:	2.0	1971	17	377-444	412.4	74
	2.1	1970	5	700-779	748.0	22
	3.1	1969	1	795	-	4
Female:	2.1	1970	4	699-742	730.9	100

Evaluation of Multiple Use Projects

Three weeks of the 1974-75 field season were utilized for catalog and inventory of small lakes and streams within or near the Perenosa Bay timber sale on Afognak Island (Figure 3). A request was made to move clear-cut Unit #117 away from a major tributory of Lily Pad Lake to protect anadromous fish spawning and rearing areas.

Bridge and culvert replacements on the Kodiak road system were reviewed and recommendations were made to protect resident and anadromous fish populations. Recommendations concerning the new highway and sewer line crossing the Buskin River were made to protect fish populations.

Public Access to Sport Fishing Waters

Land (12.5 acres) at the mouth of Pasagshak River (Figure 5) was purchased with sport fish license money to allow anglers access. Acquisition of the Pasagshak property allows complete stream bank access to the public for fishing and recreational purposes. Additional land adjacent to this parcel should eventually be obtained to facilitate parking, camping, picnicking, and sanitation areas.

Easement recommendations across lands selected by natives under the ANCSA were submitted to the Habitat Protection section for final action by the Bureau of Land Management.

Figure 5. Pasagshak River Fishing Access Purchase.

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